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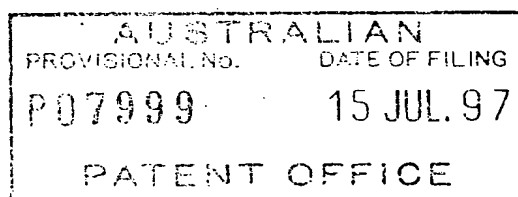WITNESS my hand this
Fifth day of December 2007

Paramjit Kour

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P/00/009
Regulation 3.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

AUSTRALIAN
PROVISIONAL No.   DATE OF FILING

P07999   15 JUL. 97

PATENT OFFICE

Application Title: Image Processing Method and Apparatus (ART10)

The invention is described in the following statement:

GH REF: 23975AB

IMAGE PROCESSING METHOD AND APPARATUS (ART10)

Field of the Invention

The present invention relates to an image processing method and apparatus and, in particular, discloses a process

5   for Utilising Exposure Information in a Digital Image Camera.

The present invention further relates to the field of digital image processing and in particular, the field of processing of images taken via a digital camera.

10   ### Background of the Invention

Recently, digital cameras have become increasingly popular. These cameras normally operate by means of imaging a desired image utilising a charge coupled device (CCD) array and storing the imaged scene on an electronic

15   storage medium for later down loading onto a computer system for subsequent manipulation and printing out. Normally, when utilising a computer system to print out an image, sophisticated software may available to manipulate the image in accordance with requirements.

20   Unfortunately such systems require significant post processing of a captured image and normally present the image in an orientation to which is was taken, relying on the post processing process to perform any necessary or required modifications of the captured image. Further,

25   much of the environmental information available when the picture was taken is lost.

Summary of the Invention

It is an object of the present invention to provide for the utilisation of exposure information in an image specific

30   manner.

In accordance with a first aspect of the invention there is provided a method of processing an image taken with a digital camera including an auto exposure setting, said method comprising the step of utilising said information to

35   process a sensed image.

Brief Description of Drawings

Notwithstanding any other forms which may fall within the scope of the present invention, preferred forms of the invention will now be described, by way of example only, with reference to the accompanying drawings which:

Fig. 1 illustrates the method of operation of the preferred embodiment.

Description of Preferred and Other Embodiments

The preferred embodiment is preferable implemented through suitable programming of a hand held camera device such as that described in Australian Provisional Patent Application entitled "Image Processing Method and Apparatus (ART01)" filed concurrently herewith by the present applicant the content of which is hereby specifically incorporated by cross reference.

The aforementioned patent specification discloses a camera system, hereinafter known as an "Artcam" type camera, wherein sensed images can be directly printed out by an Artcam portable camera unit. Further, the aforementioned specification discloses means and methods for performing various manipulations on images captured by the camera sensing device leading to the production of various effects in any output image. The manipulations are disclosed to be highly flexible in nature and can be implemented through the insertion into the Artcam of cards having encoded thereon various instructions for the manipulation of images, the cards hereinafter being known as Artcards. The Artcam further has significant onboard processing power by an Artcam Central Processor unit (ACP) which is interconnected to a memory device for the storage of important data and images.

In the preferred embodiment, the Artcam has an auto exposure sensor for determining the light level associated with the captured image. This auto exposure sensor is utilised to process the image in accordance with the set light value so as to enhance portions of the image.

Preferably, the area image sensor 2 includes a means for determining the light conditions when capturing an image. The area image sensor adjusts the dynamic range of values captured by the CCD in accordance with the detected
5   level sensor. The captured image is transferred to the Artcam central processor 31 and stored in the memory store 33. Intensity information, as determined by the area image sensor, is also forwarded top the ACP 31. This information is utilised by the Artcam central processor to manipulate
10   the stored image to enhance certain effects.

Turning now to Fig. 1, the auto exposure setting information 1 is utilised in conjunction with the stored image 2 to process the image by utilising the ACP 31. The processed image is returned to the memory store for later
15   printing out 4 on the output printer.

A number of processing steps can be undertaken in accordance with the determined light conditions. Where the auto exposure setting 1 indicates that the image was taken in a low light condition, the image pixel colours are
20   selectively re-mapped so as to make the image colours stronger, deeper and richer.

Where the auto exposure information. Indicates that highlight conditions were present when the image was taken, the image colours can be processed to make them brighter and
25   more saturated. The re-colouring of the image can be undertaken by conversion of the image to a hue-saturation-value (HSV) format and an alteration of pixel values in accordance with requirements. The pixel values can then be output converted to the required output colour format of
30   printing.

Of course, many different re-colouring techniques may be utilised. Preferably, the techniques are clearly illustrated on the pre-requisite artcard 9 inserted into the reader. Alternatively, the image processing algorithms can
35   be automatically applied and hard-wired into the camera for utilisation in certain conditions.

Alternatively, the Artcard inserted could have a number of manipulations applied to the image which are specific to the auto-exposure setting. For example, clip arts containing candles etc could be inserted in a dark image and large suns

5   inserted in bright images.

It would be appreciated by a person skilled in the art that numerous variations and/or modifications may be made to the present invention as shown in the specific embodiment without departing from the spirit or scope of the invention

10   as broadly described. The present embodiment is, therefore, to be considered in all respects to be illustrative and not restrictive.

The present provisional is one of a series of Australian Provisional Patent Applications which relate to a

15   new form of technology for the production of images. These Australian Provisional Patent Applications encompass a broad range of fields and as such, the present provisional is best viewed in the overall context of the development of this new form of technology. Appendix A attached hereto sets out the

20   details of each of the series of Australian Provisional Patent Applications and, to the extent necessary, the associated Australian Provisional Patent Applications are hereby incorporated by cross-reference.

We Claim:

1. A method of processing an image taken with a digital camera including an auto exposure setting, said method comprising the step of utilising said information to process a sensed image.

2. A method as claimed in claim 1 wherein said utilising step comprises utilising the said auto exposure setting to determine an advantageous re-mapping of colours within said image so as to produce an amended image having colours within an image transformed to account of said auto exposure setting.

3. A method as claimed in claim 2 wherein said processing comprises re-mapping image colours so they appear deeper and richer when said exposure setting indicates low light conditions.

4. A method as claimed in claim 3 wherein said processing step comprises re-mapping image colours to be brighter and more saturated when said auto exposure setting indicates bright light conditions.

5. A method as claimed in claim 1 wherein said utilising step includes adding exposure specific graphics or manipulations to said image.

Abstract

    A method of processing an image taken with a digital
camera including an auto exposure setting, said method
comprising the step of utilising said information to process
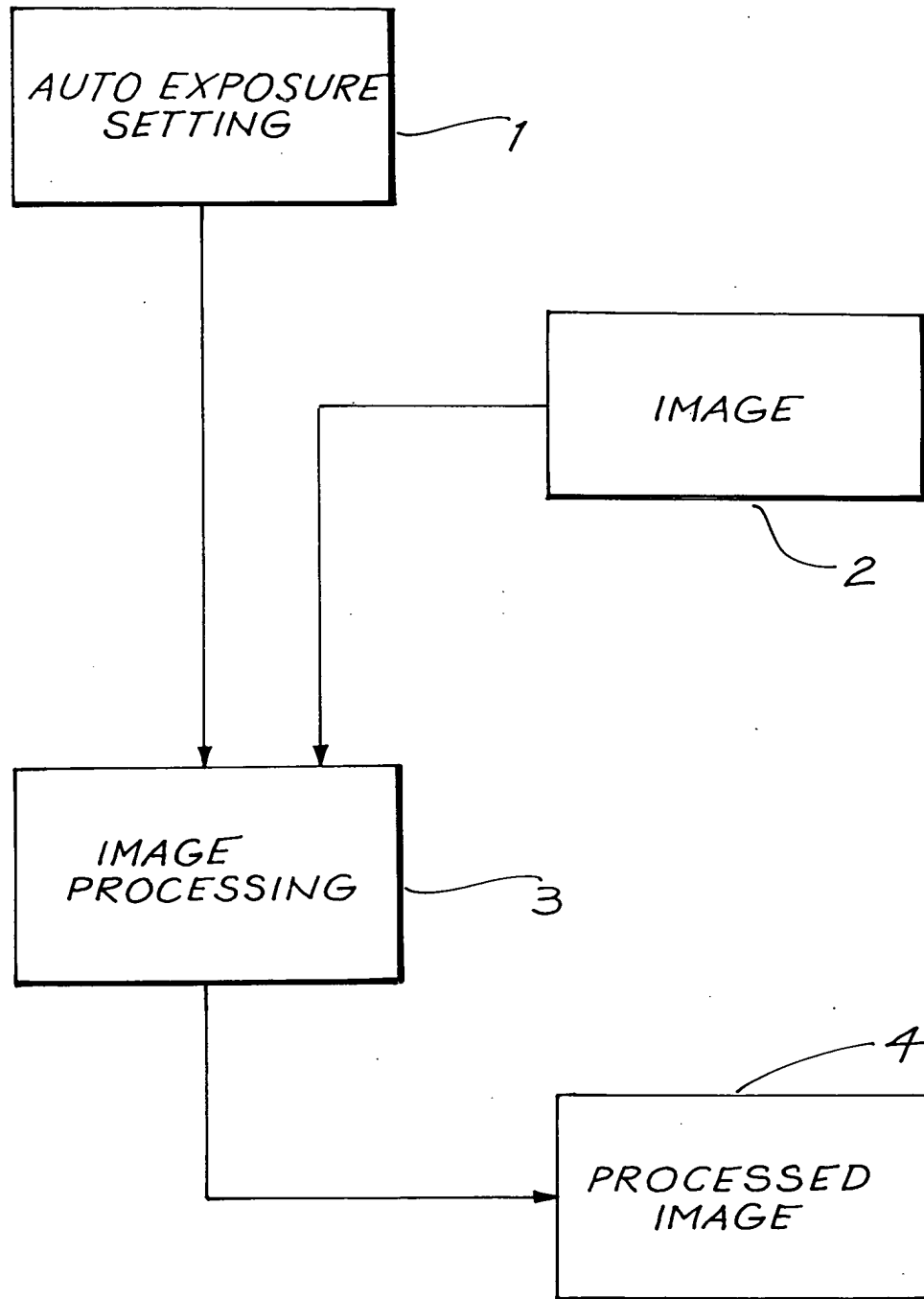5 a sensed image.

AUTO EXPOSURE SETTING	1
IMAGE	2
IMAGE PROCESSING	3
PROCESSED IMAGE	4

FIG.1